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ENTOMOLOGY.[1]

Meeting of Economic Entomologists.—A large majority of the official economic entomologists of North America met at Champaign, Illinois, November 11th to 14th, in connection with the meetings of the Association of American Agricultural Colleges and Experiment Stations and the Association of Official Economic Entomologists. There were present Messrs. Riley and Howard, of Washington, D. C.; Forbes, Marten, Hart, and Goding, of Illinois; Atkinson, of Alabama; Gillette and Osborn, of Iowa; Bruner, of Nebraska; Beckwith, of Delaware; Harvey, of Maine; Cook, of Michigan; Woodworth, of Arkansas; Garman, of Kentucky; Fletcher, of Canada; Alwood, of Virginia; Smith, of New Jersey; Aldrich, of South Dakota; Webster, of Indiana; Snow, of Kansas; and Weed, of Ohio. The utmost harmony prevailed throughout the meeting, which was probably the most notable and profitable one ever held by the economic entomologists of the country.

Inasmuch as the Association of Colleges and Stations has been reorganized on the section plan since the Association of Economic Entomologists was formed, so that most of the members of the latter belong to a section of the former, it was decided to hold the next meeting of the latter just before the meeting of the A. A. A. S. in August, 1891. The following papers were read, Nos. 2 to 11 being presented before the Committee on Entomology of the general Association.

1. Report of Committee on Entomology, by S. A. FORBES. Read before the Association of Agricultural Colleges and Experiment Stations. This consisted of a masterly review of the work in entomology carried on at the stations during the year.

2. Notes on Insecticides, by M. M. BECKWITH, detailing experiences in fighting the rose chafer, spraying for the codling moth, etc.

3. A New Root Rot of Cotton, by G. F. ATKINSON, showing that cotton roots are attacked by Nematodes, and serious injury is sometimes done.

4. Experiments and Observations in Iowa, by C. P. GILLETTE, reviewing the more important results obtained at the Iowa Station this year.

5. Methods of Laboratory Experiment, by C. W. WOODWORTH. A general discussion of methods of testing the effects of arsenites upon plant foliage, and ways of tabulating results.

[1] Edited by Dr. C. M. Weed, Experiment Station, Columbus, O.

6. New Notes on the Hessian Fly, by JOHN MARTEN, showing that there may be a fourth brood at times.

7. Life-History of *Baris confinis*, by C. M. WEED, showing that this insect develops in Spanish needles (Bidens sp.)

8. Life-History of Certain Aphididæ, by C. M. WEED, showing the autumn and winter history of a number of little-known species.

9. Life-History of *Pimpla inquisitor*, by C. M. WEED, detailing observations on the egg and larval history of this insect.

10. Contagious Diseases of Chinch Bug, by F. H. SNOW, reporting a number of successful experiments in spreading contagious disease among chinch bugs.

11. Host Relations of Hymenopterous Parasites, by L. O. HOWARD, showing the need of more precise knowledge of breeding habits of parasites, and the value of knowing the biological laws governing them.

The following papers were read before the Association of Official Economic Entomologists :

12. Address of the President, by C. V. RILEY, reviewing recent entomological work of the Department of Agriculture, and many other points of general interest.

13. Our Work and Bulletins, by A. J. COOK. A general discussion of the scope of entomological work at the stations, and methods of publication.

14. Fertilizers as Insecticides, by J. B. SMITH, showing the value of potash salts as insect destroyers.

15. The Habits of Pachyneuron, by L. O. HOWARD.

16. Notes on the Plum Curculio, by J. B. SMITH, reporting a number of observations upon this insect.

17. Notes on a New Apple Pest, by F. W. GODING.

18. Notes on the Genus Phylloxera, by C. V. RILEY.

19. An Experience with the Rose Bug, by J. B. SMITH, showing the inefficiency of nearly all ordinary insecticides.

20. Some Questions Relating to Aphides, by J. B. SMITH, discussing the poriferous structure of the antennæ, and its significance.

21. Notes on the Plum Curculio and Gouger, by C. P. GILLETTE, reporting observations on life-history, and experiments with remedies.

22. Original Work at the Stations, by C. V. RILEY. A general discussion of the subject.

23. Notes on Beet-Root Insects, by L. BRUNER, detailing observations made in Nebraska.

24. Invasion by the Clover-Leaf Beetle, by J. B. SMITH.

25. London Purple on Peach, by A. J. COOK, reviewing spraying experiments in Michigan and at Cornell University.

26. Life-History of White Grubs, by S. A. FORBES, showing that all our common species pupate in the fall, and describing early stages of several species.

27. Life-History of the Corn-Plant Louse, by S. A. FORBES, reporting investigations during a number of years by which many new points in the life-history of this insect have been brought out.

In addition to these numerous papers, the discussions throughout were of unusual interest. The entomologists are certainly to be congratulated on the large attendance and number of papers, as well as the evident desire manifested throughout the sessions to help each other in forwarding the work in which they are engaged.—CLARENCE M. WEED.

The Screw Worm.—Two bulletins concerning this insect (*Compsomyia macellaria*) have lately been issued. The first is by Dr. M. Francis, of the Texas Experiment Station, and the second by Prof. H. A. Morgan, of the Louisiana Station. That by Dr. Francis is quite short, but gives illustrations of all the stages of the insect, engraved from drawings by Miss Freda Detmers, which are shown at Plate XXXV. Dr. Francis quotes from a letter in which Dr. S. W. Williston states that the fly "occurs everywhere from Canada to Patagonia," but adds that only in Texas is it of economic importance in the United States. Cattle are especially liable to attack, but horses, mules, hogs, sheep, dogs, and in some recorded cases even men, are attacked. Dr. Francis continues:

"In all animals alike, the eggs, after being laid by the fly, hatch into larvæ or so-called 'worms.' The exact length of time this requires seems to vary with circumstances. My present opinion is that, if the eggs are laid in a moist place and on a warm day, it requires less than one hour; whereas, if laid in a dry place they seem to dry up and lose their vitality. The young larvæ when first hatched are small and easily overlooked. If they are hatched on the surface in a drop of blood from a ruptured tick, for instance, they attempt to perforate the skin, and if hatched in wounds they at once become buried out of sight. They seem to attach themselves by their heads, and burrow their way under the skin, completely devouring the soft flesh. Occasionally a few are seen moving from one place to another, but usually they remain fixed at one point. The worms grow steadily in size, and the hole in the flesh becomes larger every day. Sometimes the worm makes tunnels, but not to any depth; they usually stay on the surface.

They evidently produce considerable irritation, for the part is always swollen and constantly bleeding. This swollen, gaping appearance of the wounds, together with the constant discharge of blood, are characteristic of the presence of worms. It seems to require about a week for the worms to become fully grown. At that time they are about five-eighths to six-eighths of an inch long. They then leave the sore and go into the ground, where they pass the pupa state, and hatch out as flies in from nine to twelve days. Of several hundred hatched out by the writer, the shortest time was nine days and the longest fourteen days, but in the majority of cases it required from nine to twelve days. While the larvæ are thus developing the flies are constantly laying fresh eggs in the wounds, so that the young worms take the place of the matured ones, and thus keep up a constant and progressive loss of tissue. If the worms are not killed they eat constantly deeper, and often kill the animal. Sometimes the abdomen is opened and the bowels escape—as is especially liable in case of heifers spayed through the abdomen. At other times a tail is eaten off, or extensive caverns are made into the muscles.

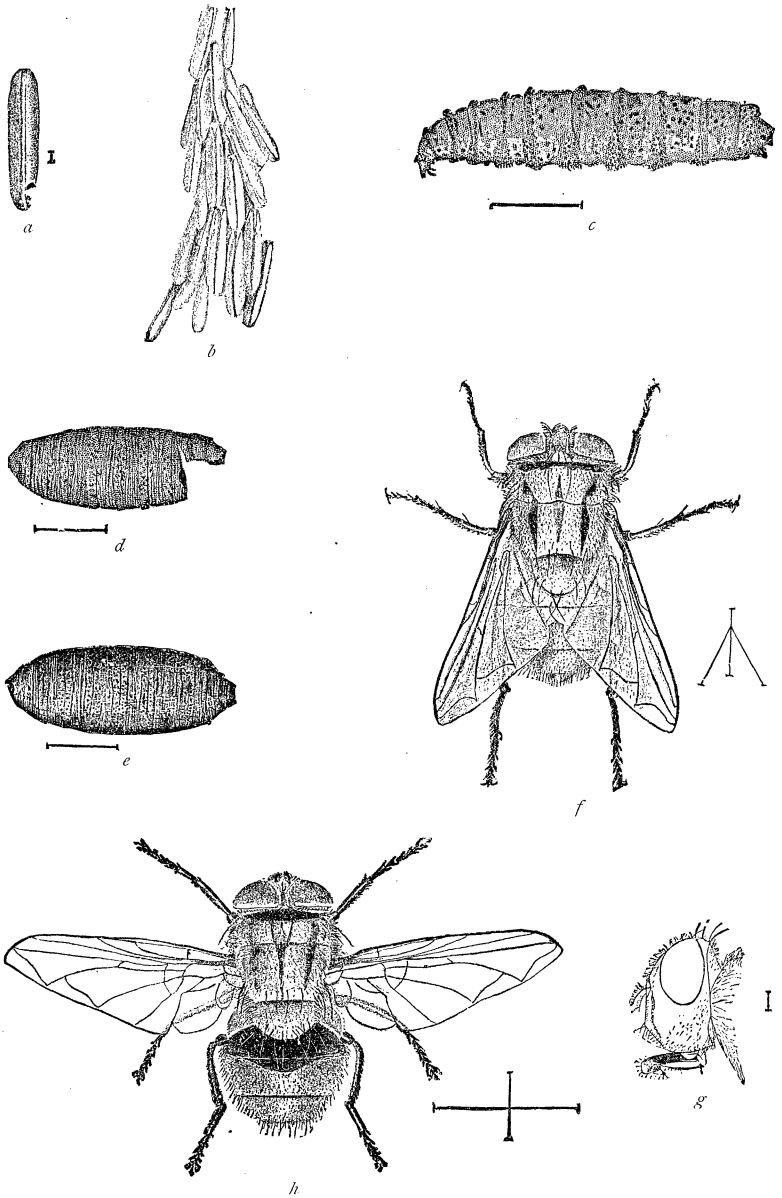
"The treatment usually employed in these cases consists simply of killing the larvæ with cresylic ointment, calomel, chloroform, or carbolic acid."

In the accompanying plate the eggs are shown at *a* and *b*, the first representing a single egg, greatly enlarged, and the second a bunch of eggs, also enlarged; the larva is represented at *c*, and the puparium at *d* and *e*, the former showing the mode of exit of the fly, which is represented at *f* and *h*, while *g* represents a side view of the head.

The egg of this insect is 1 mm. long, whitish, and cylindrical, with a longitudinal ridge on one side. The full-grown larva is 16 mm. long by 4 mm. in diameter. It is a whitish, footless grub, with transverse rows of stiff black bristles at each articulation. The puparium is brown, 10 mm. long by 3 mm. thick. The imago is described as follows: Length, 10 mm.; wing expanse, 21 mm.; color, metallic bluish-green, with golden reflections; thorax, with three black longitudinal stripes; head, except central portion of eyes, yellow; legs, black; wing veins, black; wings transparent, except near base, where they are slightly clouded. Entire body furnished with long, black, spinose hairs. Proboscis of medium length, with dilated tip.

The past summer this insect appeared in injurious numbers in parts of Louisiana and Mississippi, where it has seldom heretofore attracted attention. Prof. Morgan thinks it was imported the previous season with Texas cattle, and on account of the mild winter was not killed by

PLATE XXXV.



THE SCREW WORM (*Compsomyia macellaria*).

the frost. He has found that it is able to develop freely in decaying animal and vegetable matter.

An article concerning the appearance and injuries of the screw worm in Mississippi has lately been published by Mr. H. E. Weed, of the Experiment Station of that State, in the *Southern Live Stock Journal* (Nov. 6, 1890).—C. M. W.

North American Phycitidæ.—After many years of study of the small moths of the family Phycitidæ, Rev. Geo. D. Hulst has prepared a monograph of unusual excellence. It has been published under the title, "The Phycitidæ of North America," in the Transactions of the American Entomological Society (Vol. XVII., pp. 93–228, Plates VI.–VIII.) The systematic list given at the end of the article includes 201 species, although the author states in the opening paragraph that "it is probable that not half of our species have as yet been described." This monograph cannot fail to be of great value to working entomologists, and ought greatly to stimulate the study of these beautiful little moths. The early stages of only twenty-six species are recorded as known. The author, following his previous custom, has proposed a number of new generic terms derived from the names of extinct Indian tribes. The generic references of nearly all the well-dnown economic species have been changed; *e.g.*, the leaf crumpler (*Phycis indigenella* of authors) is now *Mineola indigenella;* the leaf skeletonizer, which so long has been called *Pempelia hammondi*, now goes to the genus Canarsia; Professor Comstock's *Dakruma coccidivora* has become a Lætilia, and the time-honored *Ephestia interpunctella* has gone back to Guené's genus Plodia, in which it seems to have been originally placed by Hübner. But these changes are inevitable, and we can only trust that the insects mentioned have received a fairly permanent generic assignment.

New Food-Plant of Rhodobænus 13-punctatus.—Pupæ and adults of this species were found in the stems of cupweed (*Silphium perfoliatum*) July 30, 1890, in central Ohio. The beetles were freshly emerged, and were crawling up the inside of the stem, evidently preparing to escape. The pupæ were in the basal portion, where abundant evidence was visible of the work of the larvæ. The latter had bored the root and basal part of the stem. No larvæ could be found at this time, all having pupated. The two later stages of the insect are shown at Fig. 1, *a* representing the pupa, and *b* the beetle. The larva has been described by Dr. Riley in the Report of the U. S. Department of Agriculture for 1881–1882 (p. 142); and in his third

Missouri Report the same author gives an account of what is supposed to be this species under the name *Sphenophorus pulchellus*. The insect

FIG. 1.—*Rhodobœnus 13-punctatus*; *a*, pupa; *b*, beetle. Both enlarged. Original.

is there called the Cocklebur Sphenophorus, and the larva is said to bore the stalks of the common cocklebur (*Xanthium strumarium*).—CLARENCE M. WEED.

Elm Insects.—Prof. G. H. Perkins has recently distributed a 96-page memoir, extracted from the Eleventh Report of the Vermont State Board of Agriculture, upon Insects Injurious to the American Elm. Eighteen introductory pages are devoted to a consideration of predaceous and parasitic insects, insectivorous birds and other animals, and the use of insectides. Then follows a short discussion of the usefulness of the American elm, and the reasons for treating of the insects affecting it, after which appears a systematic list of seventy-eight insects injurious to the elm. A more or less complete account is then given of each of these species, the writings and illustrations of previous authors being freely used, with full credit. Unfortunately the otherwise excellent mechanical execution of the *brochure* is seriously marred by the occurrence of numerous typographical errors. In several places also slips occur, due, apparently, to a lack of the latest information. For instance, in discussing kerosene emulsion, "Prof. Riley's recipe" is said to be "a mixture of oil and milk of any desired proportions," and no mention is made of the Riley-Hubbard soap emulsion, which is now the accepted formula everywhere. And under the head of beetles infesting elms a list of species mentioned by Glover and Harris is given, the names of many of which have since been changed, and some of which are synonyms. The genera Phyllophaga and Trichestes are not now recognized in the lists of American Coleoptera. The imported coccid (*Gossypari ulmi*) is called the imported elm leaf aphis. This is unfortunate, as the term aphis should at least be restricted to insects of the family Aphididæ. But

notwithstanding these occasional slips, Professor Perkins has done a very useful work in a line where his example may well be followed.

North American Pselaphidæ.—Messrs. E. Brendel and H. F. Wickham have lately published in the Bulletin from the Natural History Laboratories of the Iowa State University (Vol. I., pp. 216–304, and Vol. II., pp. 1–84) a Monograph of the Pselaphidæ of North America, which shows evidence of much careful work. Seven plates from stipple drawings by Dr. Brendel, the senior author, fairly well represent the species described. This monograph will be a great help in the determination of species in this difficult family of beetles.

MICROSCOPY.[1]

Direct Division of the Nucleus in the Enteric Epithelium of Rhabdonema nigrovenosum.[2]—Prof. Hoyer finds in the epithelium lining the alimentary tract of Rhabdonema good material for demonstrating the so-called "direct" division of nuclei. Hoyer admits, however, that his preparations are not conclusive evidence of such division.

Following Kultzitzky's method, Prof. Hoyer killed the Nematodes in "strong alcohol," stained in alcoholic borax-carmine 24hs., decolorized in acidified alcohol 1h. (strong alcohol + 1% HCl.), transferred to glacial acetic acid (15m.), then to a mixture in equal parts of glacial acetic acid with creosote, then to pure creosote, and finally mounted in creosote balsam.

Such treatment, we should think, would be likely to bring out "direct" division. We agree with Hoyer that the case needs further investigation.

Culture of the Larvæ of Ascidians, Worms, Echinoderms, etc.[3]—Dr. Ch. Julin has found the following method, suggested by Prof. Giard, to be very useful in rearing larvæ of various kinds. Material for the study of the formation of the colonies of compound Ascidians may be easily obtained in this way:

Collect the free larvæ in a pipette at the time of hatching, and place them in covered watch-glasses containing clean sea-water. Keep them protected from the light (half-dark). "Thus kept, they develop quite

[1] Edited by C. O. Whitman, Clark University, Worcester, Mass.

[2] H. Hoyer. *Anat. Anz.*, V., 1, Jan. 1890, p. 26.

[3] Extracted from a letter from Dr. Ch. Julin to Dr. Minot, dated Sept. 3, 1889.